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Could worry and rumination mediate relationships between self-compassion and psychological distress in breast cancer survivors?

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Abstract

Many breast cancer (BCa) patients experience clinically significant anxiety and depression in survivorship. Self-compassion offers a bulwark to anxiety and depression in nonclinical, mental health, and some chronic physical health populations. We examined whether self-compassion predicted lower anxiety and depression symptoms in survivors and whether this might be mediated by lower worry and rumination. The design was a cross-sectional survey using self-report measures. Female adult BCa survivors of mixed stages who had finished primary surgical, radiotherapy, or chemotherapy treatments completed self-compassion subscales and worry, rumination, and anxiety and depression scales. Higher self-compassion subscale scores were negatively associated with anxiety and depression. Depressive brooding and worry mediated any effects of self-kindness and mindfulness on depression and anxiety, whereas common humanity directly predicted lower depression scores. Findings are consistent with the view that self-compassion reduces threat-related rumination and worry in BCa survivors, consequently reducing anxiety and depression. This may form a basis for prevention and treatment.

KEYWORDS

breast Cancer, mediation, rumination, self-compassion, worry

1 | INTRODUCTION

One in eight women in the UK are diagnosed with breast cancer (BCa) in their lifetime (Breast Cancer Care UK, 2018), and 78% will survive for 10 years or more (Cancer Research UK, 2018). Survival presents challenges of adjustment to living with medical and psychosocial problems and coping with the traumas of cancer diagnosis, progression, and treatment. Approximately 25% of BCa survivors experience clinically significant levels of anxiety or depression up to 4 years postdiagnosis, twice that of age-matched general female populations (Burgess, Cornelius, Love, Graham, Richards, et al., 2005). In addition to intrinsic burden, depression and anxiety negatively affect treatment and quality of life outcomes, including treatment engagement (Bui, Ostir, Kuo, Freeman, & Goodwin, 2005;

Colleoni et al., 2000), medical recovery, satisfaction with health services (Costanzo, Lutgendorf, Mattes, Trehan, Robinson, et al., 2007; Manning & Bettencourt, 2011), adjustment to life posttreatment (Burgess et al., 2005), and overall quality of life (Costa-Requena, Rodríguez, & Fernández-Ortega, 2013; Philip, Merluzzi, Zhang, & Heitzmann, 2013).

Cognitive Behavioural Therapy is the treatment of choice for depression and anxiety in chronic physical health conditions (National Institute for Health and Care Excellence, 2009, 2011). However, its focus on dysfunctional cognition may not suit cancer survivor populations (Farrand & Woodford, 2015), where an important challenge to patients is often the regulation of negative emotion in the face of realistic but often immutable adversity (Herschbach & Dinkel, 2014; Humphris & Ozakinci, 2008).

Personality theorists assert that individual differences in emotional regulation underpin anxiety and depression (Normann, Emmerik, & Morina, 2014). Self-compassion is a relatively new dispositionally based approach to psychopathology, which describes how directing compassion towards the self can provide a buffer against adversity. Compassion involves the motivation to care for those in need and to develop and use caring skills (Gilbert, 2017). Self-compassion is compassion towards the self (Neff, 2003). Self-compassion skills may assist cancer survivors by facilitating self-care in the face of adversity. Self-compassion is reliably linked to lower depression and anxiety in mental health (Podina, Jucan, & David, 2015) and physical health samples (Przedzicki, Sherman, Baillie, Taylor, Foley, et al., 2013, Sherman, Woon, French, & Elder, 2017). A recent meta-analysis of RCTs using compassion-based interventions with mental health populations shows medium effects on anxiety ($d = .49$) and depression ($d = .64$; Kirby, Tellegen, & Steindl, 2017).

In his theory of compassion and well-being, Gilbert (2009, 2017) uses evolutionary ideas to describe emotion regulation. Theoretically anchored in cognitive neuroscience, Gilbert's social mentalities theory describes mentalities as complex motivational and skill sets pertaining to specific social behaviours, such as compassion, attachment, affiliation, or aggression (Gilbert, 2017). Activation of any social mentality is underpinned by three core neurobiological systems: threat, acquisitive, and resting systems (Gilbert, 2015). The threat system mediates fight or flight responses through sympathetic and adrenal arousal, whereas the acquisition systems is a drive-based system that facilitates goal pursuit (Gilbert, 2015). The resting system, linked to parasympathetic activation and endorphin and oxytocin release, is inimical to the threat system and underpins softer social functions such as affiliative and compassionate behaviour (Gilbert, 2015). Thus, compassionate behaviour facilitates and is facilitated by activation of the resting system and suppresses threat responses (Gilbert, 2017).

Self-compassion is application of compassionate responses towards the self. Hermanto and Zuroff (2016) propose that self-compassion requires two key mentalities, ability to provide and receive compassion, both requiring activation of rest and inhibition of threat and acquisition systems. Where people confront adversity, particularly adversity such as cancer that is outside their direct control, self-compassion allows people to regulate emotions through self-soothing (Germer, 2009; Neff, 2016). Conversely, threat or drive system responses invoke high threat focus, which is adaptive for problem-solving but can lead to rumination and self-criticism, thus undermining morale and increasing potential for psychopathology (Gilbert, 2017). Psychological intervention is aimed at long-term development of self-compassionate social mentalities using structured exercises (Shapira & Mongrain, 2010; Smeets, Neff, Albers, & Peters, 2014).

Neff proposes three key aspects of self-compassion, each with an opposing element. *Self-kindness* is a gentle, supportive, and understanding aspect towards the self. *Perceptions of common humanity* are perceptions that adversity is universal and that individuals are not alone in facing it. *Mindfulness* is a balanced openness to experience (Neff, 2003a). According to Neff, these components have oppositional

processes that constitute separate entities; *self-judgement*, *isolation*, and *over-identification*, respectively, although it has been argued that oppositional elements represent outcomes—forms of pathology—rather than true self-compassion components (Muris & Petrocchi, 2017).

1.1 | Mechanisms of self-compassion effects

Ruminative thinking and worry are characterized by thinking about personal concerns in un insightful, unproductive, repetitive and aversive ways, and difficulties in terminating these thoughts (de Jong-Meyer, Beck, & Riede, 2009). Both are associated with threat system activation and are commonly linked to different forms of psychological pathology (Gilbert, 2017). Rumination is conceptualized as three factors; *brooding*, *depressive rumination*, and *diminished reflection*. Brooding is a passive, excessive, and nonproductive focus on negative self-related events or emotions and depressive rumination a focus on depressed mood (Muris, Roelofs, Rassin, Franken, & Mayer, 2005; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Both are associated with depression in BCa (Chan, Ho, Tedeschi, & Leung, 2011; Lelorain, Tessier, Florin, & Bonnaud-Antignac, 2012). Reflection involves thinking about past events, which initially was seen to drive productive insights into adversity and consequently alleviate psychopathology (Burwell & Shirk, 2007; Raes & Hermans, 2008; Stockton, Hunt, & Joseph, 2011). However, more recent studies have shown positive associations with depression (Pössel & Pittard, 2019) and suicidal ideation (Miranda & Nolen-Hoeksema, 2007). In contrast with rumination, which focusses on current or past events (Hong, 2007), worry involves repeatedly thinking about future threats and is particularly associated with the development and maintenance of anxiety (Hong, 2007; Watkins, 2008). Worry is prospectively associated with anxiety and depression in cancer patients (Brown, Hope-Stone, Heimann, Damato, & Salmon, 2018).

Self-compassion is inimical to threat arousal and is thus associated with less rumination and worry (Krieger, Altenstein, Baettig, Doerig, & Holtforth, 2013; Neff, 2003a; Neff, Hsieh, & Dejitterat, 2005; Odou & Brinker, 2014). Thus, these might mediate any self-compassion effects of anxiety and depression. The only evidence of which we are aware, comes from a study on an undergraduate sample. Raes (2010) tested the mediating role of rumination (inclusive of brooding and reflection) and worry in the inverse relationship between self-compassion and anxiety and depression. Brooding mediated the self-compassion and depression relationship. Both worry and brooding significantly mediated the relationship between self-compassion and anxiety, with a greater role for worry.

1.2 | Aims and hypotheses

We examined whether existing interindividual variation in self-compassion subscales cross-sectionally predicts depression and anxiety in BCa survivors and whether any such relationships could be mediated by lower brooding, depressive brooding, reflection, and

worry scores. In particular, it was predicted that less brooding and depressive brooding on current and past events would be particularly strong mediators of any relationship between self-compassion and lower depression scores and that lower worry about future events would particularly mediate lower anxiety scores.

2 | METHOD

2.1 | Study design and participants

The study used a cross-sectional design and recruited a purposive sample of BCa survivors for the purpose of this study. Ethical approval was provided by the North West Research Ethics Committee (REC:17/NW/0316), and all survivors provided written consent. Survivors were eligible to participate if they (i) had completed primary medical treatment for a diagnosis of BCa in terms of completing surgical, radiotherapy, and chemotherapy treatments (a number of patients were undergoing preventive treatments such as Tamoxifen or risk-reducing mastectomy); (ii) were aged ≥ 18 years; and (iii) had not been diagnosed with metastatic cancer or new cancer subsequent to the initial BCa diagnosis. Screening questions were used to exclude these groups.

Participants were recruited by two means; a follow-up BCa service at a large National Health Service (NHS) hospital in the North of England and online via the Facebook and Twitter platforms of a third sector organization supporting UK survivors with BCa, with links posted to an online questionnaire. For the NHS site, eligible survivors attending BCa follow-up clinics, "Moving-Forward" group programmes, and routine mammogram clinics were approached by a member of their medical team and invited to participate. Additionally, research posters were displayed in the clinic areas, inviting people to speak with a member of their medical team. Interested participants could either complete and return a study pack directly or via postal return or participate online. Upon completion of the measures, each participant was given the option to enter a prize draw to win one of three £25.00 vouchers. Online participants' (either from the clinic or third sector organizations) eligibilities were confirmed through answers to eligibility questions.

In total, 102 NHS survivors agreed to receive and were handed a study pack, of which 26 responses were received via self-addressed postal return. Third sector online recruitment returned 164 responses. Of the combined 190 responses¹, two were removed from the data set due to insufficient data and three online responses regarded as duplicate because they were derived from the same device. One response was excluded due to unique demographics, which may have identified the participant in this report. One hundred and eighty-four participants were therefore included in the analyses (Figure 1). Demographic and clinical characteristics for the final sample are displayed in Table 1.

¹Multivariate analysis of variance analysis showed no significant difference between the two samples on study variables (Hotelling's $T^2(7,178) = 0.98, p = .450$). Follow-up univariate tests also showed no significant differences.

2.2 | Measures

Demographic and clinical data in Table 1 were collected from participants. Premorbid experiences and treatment of anxiety and depression are consistent predictors of anxiety and depression during survivorship (Cook, Salmon, Hayes, Byrne, & Fisher, 2018). Thus, survivors were asked if they had previously experienced or had been treated for these conditions. Predictor, outcome, and mediating variable data were collected using the following measures:

2.2.1 | Self-compassion

The "Self-Compassion Scale" (SCS, Neff, 2003b) is a widely used self-compassion measure (Neff & Germer, 2017). The original 26-item questionnaire assesses the three main components of self-compassion using 5-point Likert scales, ranging from 1 (*Almost never*) to 5 (*Almost always*). Six subscales measure self-kindness and its negative opposite self-judgement, common humanity and its opposite isolation, and mindfulness and its opposite overidentification. However, we did not use the self-judgement, isolation, and over-identification subscales because each showed a correlation of over .80 with its opposite scale. Many items also addressed processes that overlapped with symptoms of anxiety or depression or with worry or rumination (e.g., "When I'm feeling down, I tend to feel like most other people are probably happier than I am"). Each subscale has been shown to mediate the effect of a self-compassion intervention on reduced depression in BCa patients (Boyle, Stanton, Ganz, Crespi, Bower, et al., 2018). In a large cross-national study, Neff et al. (2019) showed that Self-Compassion Scale items form distinct factors that correspond to Neff's (2003b) original subscales. We used subscale rather than full-scale scores as predictors. Based on Muris and Petrocchi's (2017) view that self-judgement, isolation, and overidentification subscales represent pathology rather than true self-compassion components, we used only self-kindness common humanity and mindfulness subscales.

Subscale scores are given as means, with higher scores indicative of greater self-compassion. Scales present good test-retest reliability and convergent validity with self-esteem and self-criticism scales and good internal reliability (.92; Neff, 2003a). Subscale Cronbach alphas were: self-kindness $\alpha = .85$, common humanity $\alpha = .77$, and mindfulness $\alpha = .74$.

2.2.2 | Anxiety and depression symptoms

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is a 14-item self-report measure of the frequency and severity of anxiety and depression symptoms (e.g., "I feel as if I am slowed down"; "I get sudden feelings of panic"). Two, seven-item subscales provide independent scale scores, which can be summed for an overall psychological distress score. The HADS has been widely used in physical health and cancer to measure psychological distress (Bjelland, Dahl, Haug, & Neckelmann, 2002). A 4-point Likert scale ranges from 0 (*not at all*) to 3 (*very often indeed*). Higher scores are indicative of a greater likelihood of anxiety or depression. A score of 21 is the highest

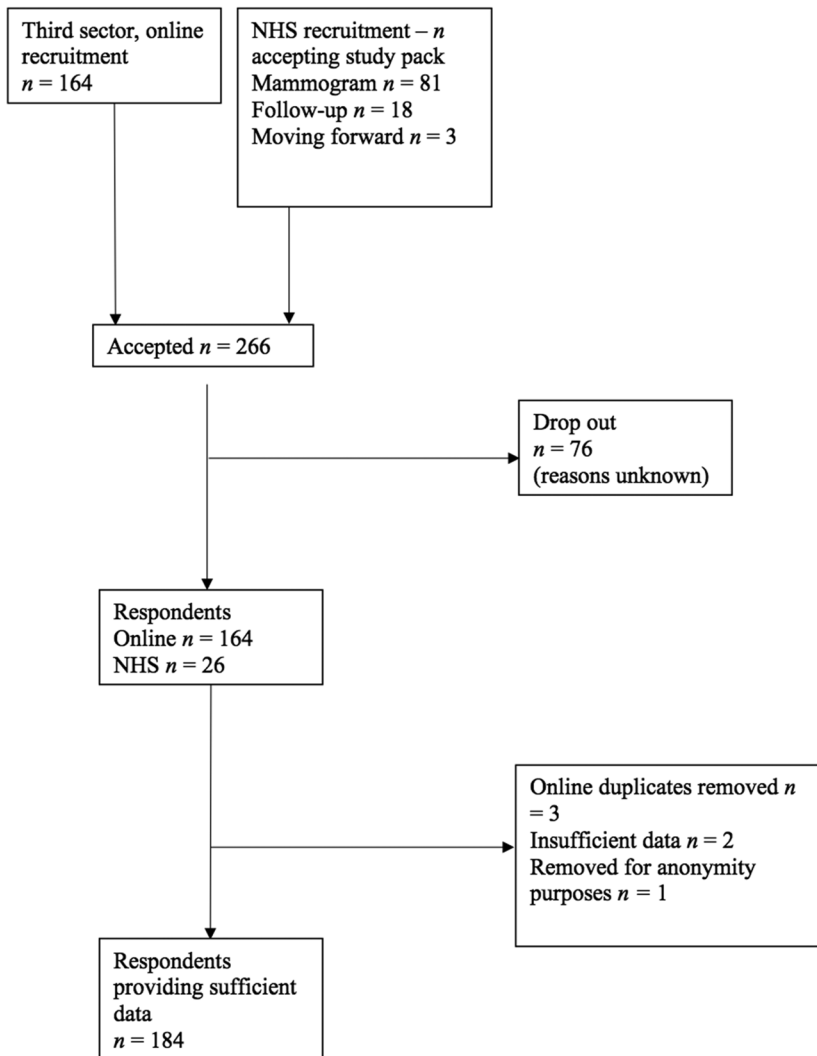


FIGURE 1 Participant flow chart. NHS, National Health Service

obtainable on each subscale. This scale has good internal consistency in cancer populations (Hammerlid et al., 1999; Moorey et al., 1991; Cronbach's alphas of .70 for depression and .74 for anxiety). In the present study, alphas were .87 and .85. Validity is indicated by prediction of anxiety and depression diagnoses through standardized clinical interviews (Vodermaier & Millman, 2011).

2.2.3 | Rumination

The Ruminative Response Scale (Nolen-Hoeksema, 1991) has subscales for "reflection" (five items e.g., "Analyse your personality to try and understand why you are depressed"), "brooding" (five items e.g., "Think what am I doing to deserve this?"), and "depression-related brooding" (12 items e.g., "Think about how sad you feel"). Responses are rated on a 4-point Likert scale from 1 (*never*) to 4 (*always*). A total score is calculated by summing the responses. The Ruminative Response Scale is taken from the Response Styles Questionnaire, which is a widely used measure of rumination in clinical as well as non-clinical populations with good reliability ($\alpha = .90$) and validity (Luminet, 2004; Nolen-Hoeksema, 2004). Cronbach's alpha for the brooding,

reflection, and depression-related subscales in the present study were .81, .78, and .93 respectively.

2.2.4 | Worry

The Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report measure using 11 positively (e.g., "I do not tend to worry about things") and five negatively worded items (e.g., "My worries overwhelm me"). Respondents rate their answers on a 5-point Likert scale from 1 (*not at all typical of me*) to 5 (*very typical of me*). Negative items are reversed scored before a total score is calculated. A higher score is indicative of greater worry, with scores ranging from 16–80. The Penn State Worry Questionnaire possesses high internal consistency ($\alpha = .93$) and good test–retest reliability (Meyer et al., 1990). Evidence also supports its use in an online format (Zlomke, 2009). Cronbach's alpha for the present study was .94.

2.2.5 | Analysis plan

Pearson correlations were used to test the relationship between self-compassion and psychological distress (i.e., anxiety and depression).

TABLE 1 Sample characteristics (n = 184)

Variable	n (%), unless otherwise stated
Age, mean (SD)	51.54 (9.42)
Months since finishing primary medical treatment, mean (SD)	29.14 (42.92)
Gender	
Female	181 (98.40)
Unspecified	3 (1.60)
Relationship status	
Single	31 (16.80)
Civil partnership	5 (2.70)
Married	121 (65.80)
Divorced	21 (11.40)
Widowed	3 (1.60)
Not disclosed	1 (0.50)
Ethnicity	
White British	171 (92.90)
White and Black Caribbean	2 (1.10)
Other backgrounds	9 (4.90)
Education	
Degree and above	109 (59.20)
Non-degree	71 (38.60)
Not applicable	3 (1.60)
Type	
Ductal	109 (59.20)
Lobular	36 (19.60)
Unknown by respondent	37 (20.10)
Type further	
Invasive	121 (65.80)
Carcinoma in situ	41 (22.30)
Unknown by respondent	18 (9.80)
Grade	
I	24 (13.00)
II	80 (43.50)
III	66 (35.90)
Unknown by respondent	13 (7.10)
Treatment completed	
Mastectomy	57 (31.00)
Mastectomy and reconstruction	50 (27.20)
Lumpectomy	89 (48.40)
Sentinal node clearance	101 (54.90)
Axillary node clearance	64 (34.80)
Endocrine	139 (75.50)
Herceptin	30 (16.30)
Chemotherapy	116 (63.00)
Radiotherapy	135 (73.40)

(Continues)

TABLE 1 (Continued)

Variable	<i>n</i> (%), unless otherwise stated
Prior mental health difficulties	
Experience of prior depression	117 (63.60)
Prior depression diagnosis	106 (57.60)
Experience of prior anxiety	142 (77.20)
Prior anxiety diagnosis	143 (77.70)

Potential multicollinearity between predictor variables was assessed using VIF scores derived from regression analyses predicting depression and anxiety from study variables. A full mediational model was tested using structural equation modelling (AMOS Version 24), which modelled indirect relationships only. Partial mediation was tested using a just-identified mediation model allowing direct paths between all self-compassion subscales and depression and anxiety. The just-identified partial mediation model was then trimmed by eliminating nonsignificant direct paths until the best fit was found. Maximum likelihood estimation for all models was made using unbiased covariances. Missing data were replaced using full information maximum likelihood estimation. Goodness of model fit was assessed by a root mean square error of approximation (RMSEA), confirmatory factor analysis (CFI), and a Tucker–Lewis index (TLI). Premorbid experiences of depression and anxiety and demographic and clinical variables were examined as covariates in models, but were only included in the final model if they improved fit or if their inclusion changed the significance of structural paths. Models were initially tested with all mediators. Trimming of putative mediator variables was achieved by deleting any that did not show unique relationships with self-compassion or outcome variables.

3 | RESULTS

Table 1 shows means and SDs of study variables. Self-compassion subscale item means were similar to those found in the literature (e.g., Neff & Germer, 2012, preintervention means). The HADS anxiety mean was 8.33, greater than the generally accepted clinical cut-off

of 8.00, for anxiety using this measure. The depression mean was 5.50, lower than the 8.00 cut-off (Vodermaier & Millman, 2011).

3.1 | Correlations between study variables

Correlations are presented in Table 2. As expected, the self-compassion subscales were negatively correlated with both HADS depression and anxiety, although common humanity generally showed smaller correlations than the self-kindness and mindfulness subscales. Worry and rumination scales were inversely associated with self-compassion and positively with HADS scales, suggesting that mediation is possible. The highest obtained VIF of 3.36 was associated with depressive brooding in predicting both depression and anxiety. This moderate multicollinearity should not unduly affect the analysis.

3.2 | Structural model

Table 3 shows fit indicators of the three structural models. The full mediation model showed poor fit (RMSEA = .138, CFI = .979, and TLI = .903). A partial mediation model allowing direct prediction of depression by common humanity provided a good fit (RMSEA = .065, CFI = .996, and TLI = .978) and was used to evaluate structural links between variables (Figure 2). Previous experiences of anxiety and depression were significantly associated with rumination variables and anxiety and depression, but they did not improve model fit or change structural paths. Likewise, demographic and clinical variables did not improve model fit or alter the significance of structural paths.

TABLE 2 Mean and SD of study variables and correlation matrix

	Mean	SD	2	3	4	5	6	7	8	9
1 Self-kindness	2.74	0.94	.59	.72	-.23	-.42	-.52	.48	-.45	-.54
2 Common humanity	3.11	0.93		.63	-.06	-.32	-.27	-.29	-.27	-.38
3 Mindfulness	3.18	0.83			-.22	-.41	-.47	-.52	-.48	-.45
4 Reflection	1.70	0.61				.69	.66	.59	.59	.41
5 Brooding	2.01	0.67					.77	.65	.66	.55
6 Depressive brooding	2.19	0.68						.69	.75	.76
7 Worry	3.19	0.90							.75	.55
8 HADS anxiety	8.33	4.59								.71
9 HADS depression	5.50	4.01								

Abbreviation: HADS, Hospital Anxiety and Depression Scale.

TABLE 3 Fit indices for mediational models.

Model	RMSEA	CFI	TLI
Full mediation	.121	.991	.957
Allow direct prediction of Anxiety	.186	.990	.898
Allow direct prediction of Depression	.043	.999	.995

Abbreviations: CFI, confirmatory factor analysis; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis index.

Reflection was not associated with any significant paths, did not improve model fit, and was trimmed from the final model.

Structural paths in the final model showed that kindness and mindfulness scores, but not common humanity, uniquely predicted reduced brooding, depressive brooding, and worry. Depressive brooding uniquely predicted both reduced anxiety and depression, whereas worry uniquely predicted reduced anxiety. Thus, depressive brooding potentially mediated any effects of kindness and mindfulness on depression and anxiety, and worry potentially predicted any effects of these on anxiety. Common humanity directly predicted reduced depression.

4 | DISCUSSION

This is the first study to show possible mediation by worry and rumination of relationships between self-compassion subscales and anxiety and depression in BCa survivors. Findings showed that worry and depressive brooding may mediate effects of kindness and mindfulness on anxiety and depressive rumination may mediate effects on depression. Common humanity directly predicted lower depression scores without mediation.

We note consistency with previously observed links between self-compassion and lower anxiety and depression in other physical health conditions (Macbeth & Gumley, 2012). Potential mediation by rumination and worry is consistent with previous literature (Raes, 2010). Mindfulness has consistently been linked to lower rumination (Tomlinson, Yousaf, Vitterse, & Jones, 2018) as has self-kindness (Boyle, Stanton, Ganz, Crespi, & Bower, 2017). A social mentalities approach suggests that self-compassion activates the resting system, thus suppressing the threat system and consequently reducing threat

focus and self-criticism (Gilbert, 2017). Confirmation requires evidence that parasympathetic and hormonal indicators of resting system arousal mediate links between self-compassion and brooding and worry. Compassion induction is related to increased parasympathetic arousal, endorphin and oxytocin release, and reduced sympathetic–adrenomedullary system arousal (Kirschner, et al., 2019; Rockliff et al., 2011). Future research is needed to determine whether these mediate the effects of compassion on brooding and worry.

Importantly, lower rumination and worry mediated effects of self-kindness and mindfulness, but common humanity only directly predicted depression. We speculate that, whereas self-kindness and mindfulness represent self-guided behavioural responses to adversity, common humanity additionally represents a form of connectedness whereby adversity is seen as explicitly social terms (Crocker, Niiya, & Mischkowski, 2008). Thus, the awareness of others affected in similar ways provides not just a relative sense of normalcy, but also affiliative possibilities for shared coping (Cohen & Janicki-Deverts, 2009). From a social mentalities viewpoint, common humanity may access mentalities related to attachment or affiliation as well as compassion (Gilbert, 2017). Thus, common humanity might operate less through reducing threat arousal, but more positively through affiliative responses that are known to promote positive affective changes (Kim, Han, Shaw, Shah, McTavish, et al., 2012).

Potential mediators of self-compassion differed for anxiety and depression. Worry and depressive brooding predicted anxiety, whereas only depressive brooding predicted depression. Depressive brooding involves rumination over current emotional responses to past events. Depression is conceptualized as a response to loss or harm (Eysenck, Payne, & Santos, 2006) with negative cognitions focussed on the meanings of past or current experiences. Brooding did not uniquely predict depression, suggesting that it is not rumination of past events, per se, that is harmful, rather the key element is survivors' ruminative thoughts about their own emotional responses to those events (Nolen-Hoeksema, 1991). As a form of future-oriented rumination, it is unsurprising that worry was a less powerful unique predictor of depression.

Anxiety, however, has been conceptualized as a fear of future loss or harm (Eysenck et al., 2006), with cancer survivors particularly

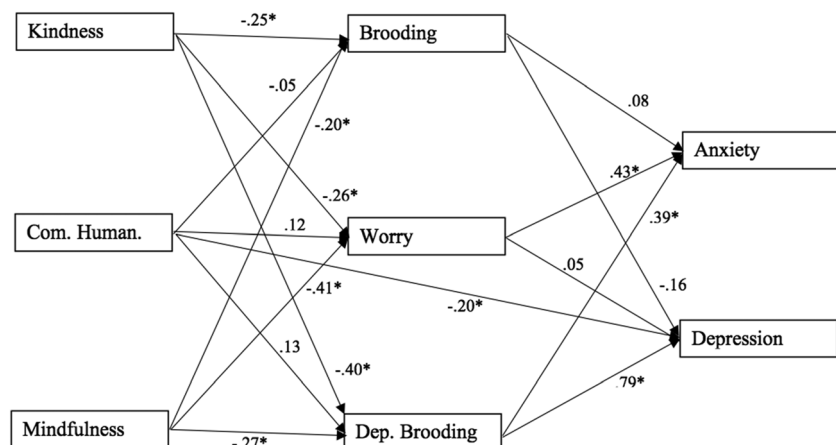


FIGURE 2 SEM showing standardized structural path coefficients (*significant paths). Com., compassion, Dep., depressive

sensitive to the possibility that cancer will recur (Fardell et al., 2016). Worry is a future-oriented cognition (Hay, Buckley, & Ostroff, 2005), and survivors are known to worry about recurrence and physical, psychological, and social aspects of their recoveries (REF). Importantly, worry in cancer survivors is often resistant to reassurance (Van Dijk et al., 2003), and self-compassion may thus represent a potentially effective remediation where reassurance is ineffective. It is unclear why depressive rumination also predicted anxiety, although it seems reasonable to speculate that survivors may fear that negative emotions will extend into the future.

Reflection was not uniquely associated with self-compassion, anxiety, or depression. Previous research on reflection has been mixed; some studies showed it to be protective (Raes & Hermans, 2008; Stockton et al., 2011) and others a risk factor (Pössel & Pittard, 2019). Several studies show that the influence of reflection may depend upon its interaction with other variables. Reflection is seen as a precursor of active coping, but reflecting on negative experiences can be harmful if people do not implement active coping (Marroquín, Fontes, Scilletta, & Miranda, 2010) or implement ineffective coping (Pössel & Pittard, 2019). Thus, links between reflection and other variables are likely to be complex and possibly difficult to detect. Further, effects of reflection may be difficult to detect in multivariate analyses due to correlations with other forms of brooding and worry.

4.1 | Study limitations

Cross-sectional designs have two drawbacks; they cannot demonstrate sequence or causality of mediational relationships, and associations can be inflated by common method bias. Common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012) probably explains a proportion of variance shared between all variables. However, each indirect effect was resilient to statistical control of other potential mediators. This independence of prediction is not consistent with a common method explanation. Interpretation of indirect effects can be hazardous when variables show strong intercorrelations, as in this study. However, VIF statistics indicated only moderate multicollinearity. Online data collection has the disadvantage that we cannot quantify participation rate or bias. Further, our self-selected sample was linked to a supportive charity and thus probably not representative of the general BCa population. Recruitment rate for the hospital sample was low, and it is unknown systematic factors may have influenced potential participants' decisions as to whether to take part or not.

4.2 | Clinical and research implications

Notwithstanding the above limitations, findings provide early indications that self-compassion allows BCa survivors to avert some of the worry and rumination that would normally precede anxiety and depression symptoms. Effective self-compassion focussed interventions for depression and anxiety exist, and one report of a small-scale intervention that reduced fear of cancer recurrence has already been published (Gonzalez-Hernandez, Romero, et al 2018). A key priority

is to use prospective research designs and further RCTs to show causality. Mapping key indirect relationships should also be a priority, as therapeutic interventions can be honed to specifically target mediators. It will also be important to identify aspects of BCa, such as fear of recurrence, that are particularly difficult for survivors and to develop interventions that are tailored to these problems. It will also be important to understand the factors, such as patients' specific concerns and psychological features that moderate or facilitate intervention effectiveness.

The contents of BCa survivors' beliefs, whether evidence-based or not, are important influences on anxiety and depression. Our findings do not diminish this importance. Indeed, self-compassion theory highlights the importance of fundamental beliefs and expectations that survivors hold about themselves in coping with adversity, which might moderate or augment the effects of other negative beliefs. Thus, after further research, self-compassion perspectives could be used to complement traditional Cognitive Behavioural Therapy approaches.

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